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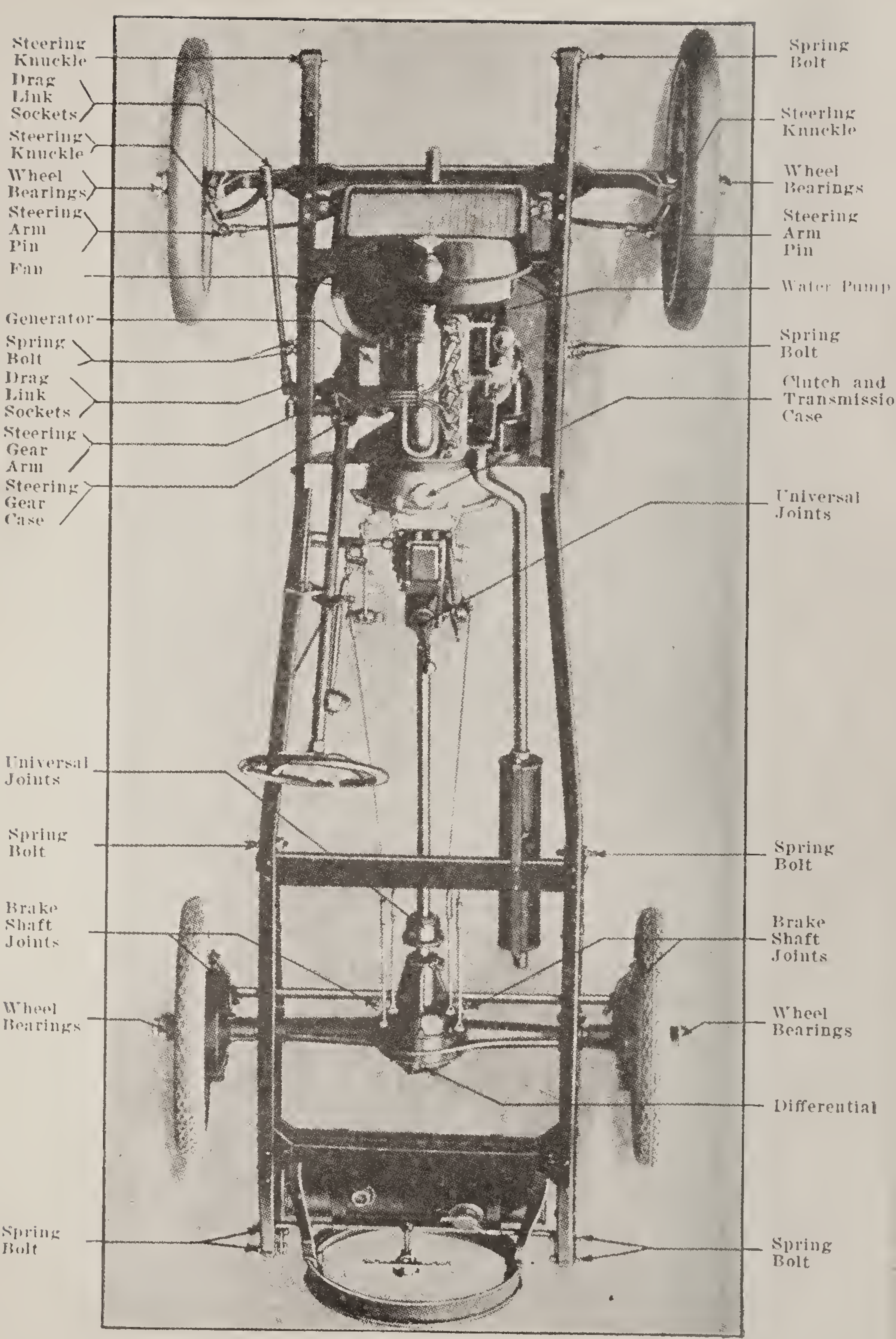
Steering Knuckle
Drag Link Sockets
Steering Knuckle
Wheel Bearings
Steering Arm Pin
Fan
Generator
Spring Bolt
Drag Link Sockets
Steering Gear Arm
Steering Gear Case
Universal Joints
Spring Bolt
Brake Shaft Joints
Wheel Bearings
Spring Bolt
Spring Bolt
Steering Knuckle
Wheel Bearings
Steering Arm Pin
Water Pump
Spring Bolt
Clutch and Transmissio Case
Universal Joints
Spring Bolt
Brake Shaft Joints
Wheel Bearings
Differential
Spring Bolt

A CHECKING SYSTEM OF UPKEEP FOR AUTOMOBILES AND TRUCKS

BY

R. C. ROGNON

President of the

SOCIETY OF AUTOMOBILE MECHANICS OF AMERICA

Price $2.00

Published by
MONROE PRESS
225 WEST 39th STREET
NEW YORK

$2.00

I am stronger than the combined armies of the World;

I have killed more men than all the wars of the World;

I am more deadly than bullets;

I have wrecked more homes than the mightiest of siege guns;

I steal in the United States alone over Three Hundred Million Dollars each year.

I find my victims everywhere, among the rich and poor alike, the young and the old, the strong and the weak, widows and orphans know me.

I loom up in such proportions, that I cast my shadow over every field of labor, from the turning of the grindstone to the moving of every train.

I am relentless, I am everywhere, in the home, on the street, at railroad crossings and on the sea.

I bring sickness, degradation, and death, yet few seek to avoid me.

I am your worst enemy, I am Carelessness.

INTRODUCTION.

Few people realize the amount of time and money that can be saved if they would only take proper care of their cars. In this time of need we must learn the meaning of thrift in all things. We are constantly confronted with conservation measures in food, coal, and other essentials, and the conservation of money is equally important, patriotic and wise. Carelessness in the care of the car is the cause of more than fifty per cent of the broken down cars that are in the repair shops in the United States, today. Automobile salesmen have impressed their customers with the importance of proper upkeep. Manufacturers have spent large sums of money for technical instruction books pertaining to the construction of their cars, yet the waste goes on. Who is to blame?

The simple fact is that no concise and practical plan has been outlined, for the owner, to enable him to take proper care of his car, either by himself or through his garage man. To outline in a simple and condensed form a checking system of upkeep which will prolong the usefulness of the car, reduce the yearly sum expended for its maintenance and promote a better understanding between owner and repair man, is the mission of this little book.

S. A. M.

The Society of Automobile Mechanics represents your garage or repair man, and this booklet is their appeal for a systematic method of upkeep to replace the happy-go-lucky, hit-or-miss method now in vogue. No one in the automobile business comes closer to the owner and his viewpoints on this subject than the automobile mechanic. To elevate our craftsmanship and to promote the greatest measure of efficiency, standardization is essential, and a uniform and regular plan of upkeep for the car is as necessary for its efficiency as a proper diet is for the well being of the individual. To attain this object we need the confidence and co-operation of the owner.

Before the advent of the automobile the horse served as a means for recreation and travel, and unless the horse was well fed and properly cared for right from the start, a sacrifice of pleasure and travel was incurred. Today the automobile is so substantially constructed and such a perfect piece of mechanism that it can run for a considerable length of time with very little attention to its upkeep before any signs of trouble appear. But when trouble does come, it comes thick and fast, necessitating a belated effort at repairs and usually resulting in a complete rebuilding of the car or a resort to the more popular method of trading it in for a new one.

Years of experience have convinced the Society of Automobile Mechanics that the system of upkeep here outlined will prove a boon to the automobile owner and repair man. Mileage is the foundation of this system. Series A represents the work to be done for every 100 miles traveled, and consists of ten operations. Series B represents the additional work to be done after 500 miles have been traveled. Series C represents the additional work to be done after 1000 miles have been traveled. Series D represents the additional work to be done after 2000 miles have been traveled, and so forth up to 50,000 miles. If the operations outlined in series A are conscientiously performed for every 100 miles up to 50,000 and series B, C, D, and so forth at their respective mileage intervals, and a record of their operations and cost kept in the spaces allotted to them, the owner will find that the expense of upkeep is considerably reduced and he will have the added pleasure of the constant use of a car in excellent running condition.

Use your instruction book first, then keep a record of upkeep, using our booklet, but the most important of all is to confide in a competent repair man, not after you are in trouble, but before troubles develop. It is unnecessary for us to print a booklet for every make of car on the market, and as all manufacturers use nearly the same principle in construction, and are different only in design of the different units, the care of the different makes will vary but little.

INDEX.

NOTE—In some of the different makes of cars the difference in design requires special lubrication, such as over head valves, some styles of water pumps and accessories that are added to some cars. We have left blank spaces so that you can fill in these operations if they are necessary, after referring to your instruction book or to your garage man.

SERIES A—EVERY 100 MILES

Operation No. 1

See that your gas tank is nearly full all the time. The more air space there is in the tank, the more the gasoline will evaporate. See that the tiny vent hole in the gasoline tank cap is not clogged, as this will obstruct proper flow of the gasoline where gravity or vacuum systems are used. Where a pressure system is used and the gas tank cap leaks air, fill the threads of the cap with soap.

Operation No. 2

See that the oil level in your crank case is correct, and use an oil you *know* is good.

Operation No. 3

Fill your radiator to a level of within one-half inch from the bottom of the neck of the radiator. This gives the water a better chance to circulate than if the neck were full. Clear rain water is free from chemicals that tend to clog up the tiny cells of your radiator and should be used if possible. A proportion of one-half pint of glycerine to five gallons of water should be used to keep the scale of lime and alkali from forming on the walls of the radiator. Keep mud and dirt from the outside surface of the radiator, as they obstruct proper circulation of air to cool the radiator.

Operation No. 4

Keep your tires properly inflated, and have the small tread cuts and sand blisters vulcanized before it is too late. Tire dealers throughout the country claim that over threefourths of tire troubles are caused from under-inflation. The air pressure in your tires acts as a brace for the fabric walls. The terrific road shocks your tires have to stand while supporting the weight of your car, will break down the fabric walls if they are not properly braced with air. Refer to your instruction book for proper pressure, or the number of pounds required is usually stamped on the tire. If you have to guess temporarily, twenty pounds of pressure to every inch of diameter of your tire is nearly correct. Some motorists keep their tires under-inflated in the hot summer and there is considerable misunderstanding about summer pressure. Your tires should be kept at the recommended pressure, but as this pressure does not take into consideration the increase in temperature and consequent expansion, that is created by road contact in extremely hot weather, you should test your tires when they are warm. If before starting on a long trip on a hot day, you inflate your tires in a cool building after they have stood on the cool cement floor all night, about twenty per cent decrease in pressure should be allowed for expansion and your tires tested when they are hot to determine whether the allowance is correct. If your front tires show excessive wear see that your front wheels are properly lined up. (See Operation No. 26.) If your rear wheels show excessive wear inspect to see that the complete rear end has not shifted out of line due to broken rear radius rod or loose spring clamps. Where the front and rear tires are of the same size they should be shifted when they begin to show wear. The right rear wheel is subjected to the hardest work and when it begins to show wear it should be shifted to the left front wheel where the strain is the lightest of all the wheels, and the left rear can be shifted to the right front wheel. When you stop to consider the weight of your car you won't drive *any* distance on a flat tire, if you have to come in, wrap a rope around the rim. If your car is not in use for any length of time it should be jacked up and the pressure removed, relieving all strain from the tires.

OPERATION NO. 5

The fan rotates at a high rate of speed, and should be lubricated every morning. If grease cups are used, give them one complete turn. If oil cups are used see that they are full.

OPERATION NO. 6

See that the steering knuckle pivot pins and steering knuckle tie rod pins are well lubricated. If the oil or grease holes in the pins become clogged with dirt, the lubricant will not reach the bearings, making the car hard to steer. In this case the pins should be removed and oil holes cleaned out to make sure the lubricant reaches the bearing.

OPERATION NO. 7

The front and rear spring shackle bolts must be well lubricated to get proper spring action. Be sure the grease oozes out of the edges of the bearing after turning down the grease cups. If oil cups are used, fill them and squirt a little oil between the outside edges of the shackles.

OPERATION NO. 8

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OPERATION NO. 9

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OPERATION NO. 10

. . . .

SERIES B—EVERY FIVE HUNDRED MILES

OPERATION NO. 11

Be sure your speedometer swivel is well greased, fill and turn down the grease cup several times. See that the fibre gear meshes properly with the wheel gear.

OPERATION NO. 12

The steering connecting rod, or sometimes called drag link, ball joints are usually packed with grease and have a leather boot laced around the joint to keep dirt and sand out. Keep these joints well packed with grease. Where grease cups are used, they should be turned down till the grease oozes out of the joints.

OPERATION NO. 13

Be sure your fan belt is tight enough. It should be driven as fast as possible to properly cool the water in the radiator and the belt should be kept free from oil and grease. A good belt dressing adds to the life of the belt and prevents slipping. See that the fan blades are bent at the proper angle.

OPERATION NO. 14

Your ignition unit requires very little attention as a rule. Where magneto is used, you should use a few drops of three-in-one oil. This can be purchased in handy cans to put in your tool box. Too much oil in your magneto will work into the armature and gum it up. Where battery ignition is used with the distributor either grease or oil cups are usually used. Too much lubricant should not be used as it will work up into the breaker points.

OPERATION NO. 15

Three-in-one oil should be used in the generator bearings where they are of the ball type. These bearings are packed with vaseline when they leave the factory and the light machine oil works into the bearing and keeps the vaseline from gumming up. Where the bronze bearings are used common engine oil should be used.

OPERATION NO. 16

See that the starting motor bearings are lubricated. If the bendix drive is used in connection with the starter, the shaft should not be lubricated with oil as it will gum up. Wash the shaft with gasoline and sprinkle dry Dixon's Motor Graphite on the shaft and work the gear back and forth by hand. Where the plunger type of starting switch is used, a few drops of three-in-one oil will prevent wear to the shaft. (See Fig. 2.)

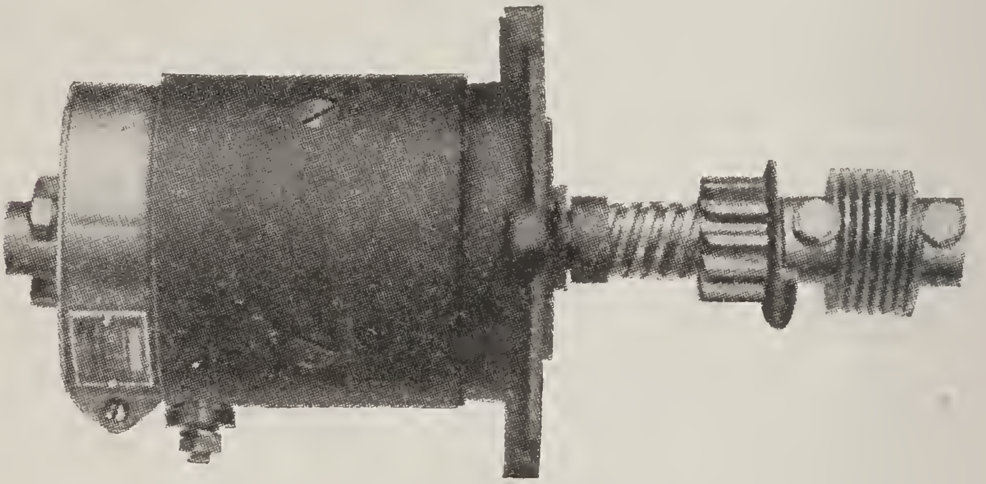

Fig. 2—Starting Motor, Showing Bendix Drive

Operation No. 17

See that the spark and throttle control shaft joints get a few drops of engine oil.

Operation No. 18

See that the plates in your battery are covered with at least one-half inch of distilled water. If you can't determine the depth of the water, use a glass tube open at both ends. Drop it in the battery until it rests on the top of the plates and by putting your thumb over the top of the glass tube to create vacuum, you can determine the depth of the water, which will stay in the tube after it is lifted from the battery. The battery terminals should be kept clean and free from corrosion so the current will have a clear path in and out of the battery. Sand paper should be used to clean them and vaseline smeared on the surfaces will prevent corrosion. Paint the outside of the battery terminals with a solution of enough alcohol to dissolve a few small pieces of sealing wax to prevent corrosion. Be sure and test battery with Hydrometer before adding water—not after.

OPERATION No. 19

The removing of carbon from the combustion chambers is necessary to have a smooth running motor. This should be done every two thousand miles. We have found that the guarding against carbon forming in hard cakes in the combustion chambers is necessary. After coming into the garage from a trip or when the motor is real warm, pour a tablespoonful of kerosene into each one of the petcocks or through the spark plug holes. This has a tendency to soften and loosen the carbon. After the kerosene has set for about ten minutes, start the motor and pour a pint of hot water very slowly through the air intake of the carburetor. The motor sucks this water up into the hot combustion chambers where it turns to steam. The chemical action of the oxygen in the steam and the hot carbon form a gas, and with the loosened cakes of carbon pass through the exhaust valve. If a cutout is used in the exhaust pipe, this should be opened to eliminate the carbon from passing into the muffler. If your car is not equipped with a cutout, a wooden mallet or block of wood should be used and the walls of the muffler tapped lightly while the motor is running. This will loosen the soot and carbon from the walls of the muffler, and the exhaust gases will blow them out. A tablespoonful of Dixon's Motor Graphite should then be inhaled through the air intake of the carburetor. The motor sucks this dry lubricant into the combustion chambers where it works into the valve guides and on the cylinder walls. The lubricating qualities of graphite are not affected by the intense heat of the combustion chambers.

OPERATION No. 20

Remove the plugs from the bottom of your crank case and drain all the old oil out. Next put in the plug or plugs and fill the crank case to the proper oil level with kerosene. The motor should then be started and run at a good speed for fifteen seconds. This will churn the kerosene in the crank case, where it will loosen all the sediment and dirt. Now remove the plug and drain out the dirty kerosene. In some types of motors there are small troughs under each connecting rod. These would still be full of this dirty kerosene. In some cases the crank case can be removed easily, and washed out. In other cases the plugs should be left out after draining the kerosene. As the new oil is poured in the crank case, it will force the dirty kerosene out of the troughs. The instant the lubricating oil starts to run out of the drain plugs instead of the dirty kerosene, the plug can be replaced and the crank case filled with clean oil.

OPERATION No. 21

The clutch requires very little attention. If the leather faced cone clutch is used, the leather facing should be kept softened with neetsfoot oil. In some motors the oil can be applied with a feather or small brush, while in others a squirt gun must be used. Where the dry multiple disc clutch is used, it requires very little attention unless the clutch facings get gummed up. It is then advisable to bathe the clutch in kerosene. The clutch yokes or throwout collars and thrust bearings used on these types of clutches require lubricating. Refer to your instruction book and be sure they are getting the proper attention. Where the clutch runs in a bath of oil little attention is needed with the exception of replacing the oil. This can be done by removing the plug at the bottom of the clutch housing, replacing the plug, flushing with kerosene and refilling, or in cases where the clutch is lubricated from the motor the only attention required would be an occasional adjustment if the clutch slips.

Operation No. 22

Use an oil can to squirt oil on the clutch and foot brake shaft joints. The same method should be used for emergency brake rod joints, foot brake rod joints, and the brake cam shaft and joints.

Operation No. 23

See that the universal joints are well packed with grease. Where a plug is used a grease gun must be used and where grease cups are used, they should be filled and turned up several times.

Operation No. 24

Where the rear spring seats should be lubricated, fill the cups and turn until the grease oozes out of the joints and then wipe off with a cloth.

Operation No. 25

In most motors the timing gears use the same oiling system as the motor, but where the timing gear case is made separate from the crank case, the proper lubricant recommended by your instruction book should be added.

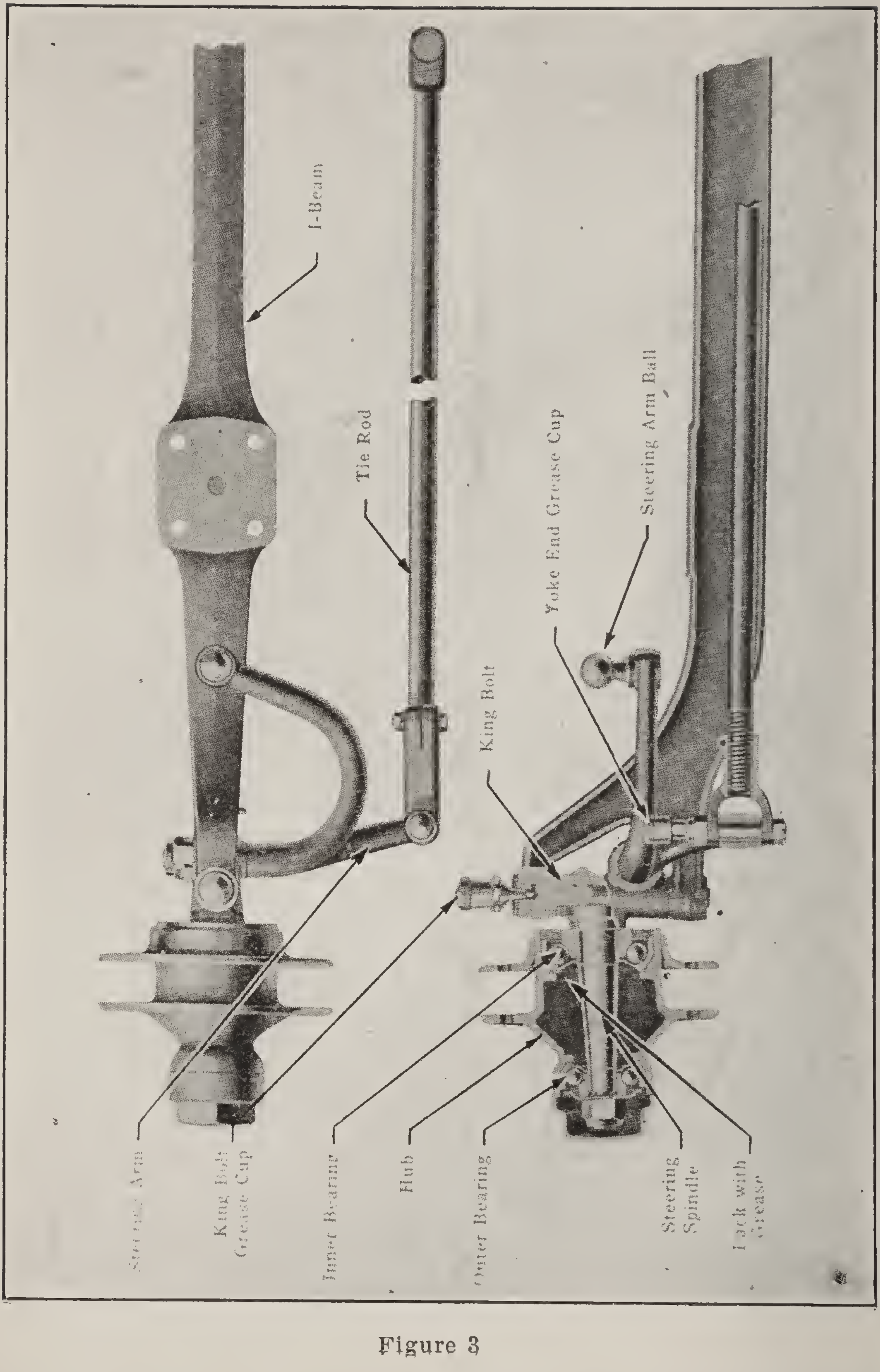
I-Beam
Tie Rod
Steering Arm Ball
Yoke End Grease Cup
King Bolt
Steering Arm
King Bolt Grease Cup
Inner Bearing
Hub
Outer Bearing
Steering Spindle
Pack with Grease

Figure 3

Operation No. 26

The alignment of the front wheels is a very important factor in the life of tires. To make steering easier, and the front tires wear evenly, the front wheels should be toed in. The amount of toe-in is adjusted by lengthening and shortening the tie rod which connects the steering arms. To adjust, remove the tie rod bolt from the steering knuckle, and slip the yoke off the arm. (See Fig. 3.) After loosening the clamp bolt, the yoke can be screwed on the tie rod to shorten, or screwed off to lengthen, as desired. The distance between the front part of the wheels and the back part of the wheels, on a level with the hub or center of the wheel and from the inside felloe to felloe should be 5/16 of an inch. Be sure and take both measurements the same distance from the ground. This slight fore-gather overcomes a tendency of a wheel to turn outward and is what makes a car so easy to handle on a road. The front wheels are also dished, the distance between the top of the wheel and the bottom of the wheel is about two inches. This is done to relieve the strain on the steering knuckles. If the wheels were in a vertical position they would set on a line outside the knuckle and all the strain would be centered on the steering knuckles and their pins. The dishing of the wheels divides the strain between the knuckle and the wheel, so that the wheel bears its full portion of the load.

Operation No. 27

Be sure the spring clamp bolts are tight.

Operation No. 28

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Operation No. 29

. . . .

Operation No. 30

. . . .

SERIES C—EVERY 1000 MILES

Operation No. 31

To properly lubricate the springs, first jack up the weight of the car from the springs, and then loosen the clamps that hold the spring to the axle. By wedging a screw-driver between each leaf, and using a putty knife or case knife, a graphite paste can be inserted between the leaves. This paste should be made of lubricating oil and Dixon's flake graphite. Be sure the clamps are tightened as this is the cause of many broken springs. If the spring leaves are rusty they should be dissembled and the rust removed with coarse emery cloth or polished on a buffing wheel in the shop.

Operation No. 32

Remove and clean the spark plugs. Be sure all the gaps are the same and proper width. As a general rule they should be about the thickness of a smooth dime.

Operation No. 33

Inspect platinum breaker points in your ignition unit, and if they are rough, pitted or burnt, they should be cleaned with a platinum point file, care being taken that the face of each point fits squarely against the other, and that the distance of the gap, when opened, is correct. These points are usually in an awkward place and a small pocket mirror will enable you to see what you are doing. If platinum points are used in your generator cut out, they should be cleaned in the same way.

OPERATION NO. 34

Be sure the generator is charging at the proper rate. To test, turn on all the lights, and with your motor running at a speed equal to fifteen miles an hour on a road, your ammeter should show a slight charge. This will prove that the charging rate of the generator is strong enough to overcome the discharge of the lights and slightly charge the battery. Have your garage man test the charging rate of your generator to be sure it is not overcharging, as this will heat your battery and in most cases, the armature of your generator. The dust cap of your generator should be removed, leaving access to the armature. With the motor running the armature should be cleaned with a soft cloth, moistened in gasoline, but if the armature is rough or pitted a piece of very fine sand paper, on the end of a soft pine stick should be used to smooth the armature. Never use emery paper. If sparking of the brushes occurs excessively, after the armature has been cleaned, see that the brush holders are in proper alignment. If this does not remedy the sparking, it is probably due to high mica between the commutator segments, and should be taken to a competent repair man to be remedied.

OPERATION No. 35

The dust cap from the starting motor should be removed, and the same method in cleaning the armature should be used as outlined to clean the generator armature. However, the starting motor is not as delicate an instrument as the generator and seldom gives trouble. Be sure the terminals of the wires leading to the starting motor are tight, and that the brush springs hold the brushes firmly against the armature.

OPERATION No. 36

Fill the differential to the proper level. Too much lubricant in the differential will follow the axles through the wheel bearings into the brake drums, where it will cause the brakes to slip.

OPERATION No. 37

Be sure the transmission is filled with grease to the proper level.

OPERATION No. 38

Clean the sediment trap underneath the gas tank, if there is one. If vacuum tank is used, about a half pint of gasoline should be drained through the petcock at the bottom, which will clean the sediment. On most carburetors there is a small sediment trap and strainer used, which should be cleaned.

OPERATION No. 39

Be sure the lugs that hold the rim of the tires on the wheels are tight, to prevent the rim from creeping. In placing the rim on the wheel, the lug opposite the valve stem should be tightened first. It should be tightened enough to hold the rim firmly against its seat on the backside of the wheel. Next, tighten the lugs on either side of the valve stem, to the same tension. The wheel should next be rotated to be sure the rim is true. The other lugs can then be tightened, first one, on one side, and then on the other, and then all the lugs cinched, so that the rim doesn't creep on the wheel.

OPERATION No. 40

To adjust and equalize the brakes, both rear wheels should be jacked up. Have someone sit in the driver's seat and apply the foot brake half way. The brakes should then be adjusted so that they just start to bind. Be sure that one side does not bind more than the other. Now with the foot brake pressed clear down, the rear wheels should be locked. The emergency brakes can be adjusted the same way. (See Fig. 4.)

OPERATION No. 41

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SERIES D—EVERY 2,000 MILES

OPERATION No. 42

To remove the front wheels, jack up the axle and remove the hub cap, now remove the cotterpin from the locknut on the spindle, and remove the nut. (On most cars the right hand spindle has a left hand thread, and the left hand spindle has a right hand thread.) After removing the locknut and washer, and where ball bearings are used, the outside cone, slide the wheel from the spindle.

Inspect the bearings and if they are in good shape wash with gasoline and repack with light grease.

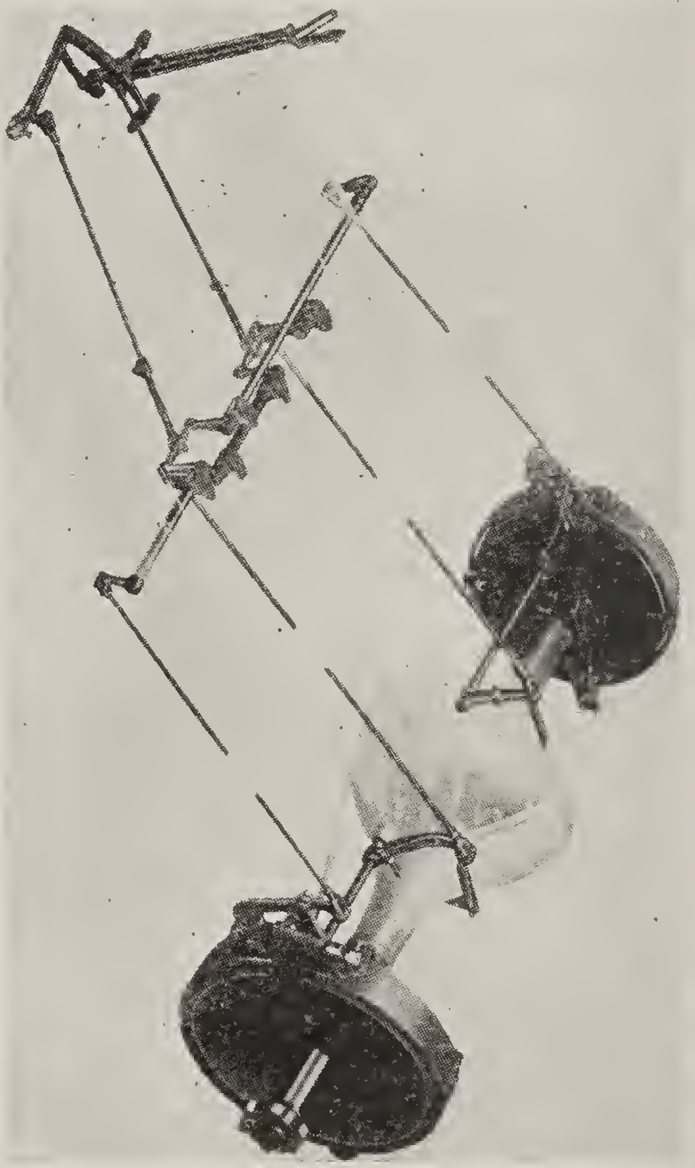


Figure 4

Care must be taken in assembling and adjusting the wheel. Never adjust the wheel bearings so tight that the weight of the tire valve, if placed on the side, will not carry itself to the bottom, although there must be no end play in the bearings. After adjusting the wheel, to revolve freely, by grasping the top and bottom of the wheel, and pushing in and out, any side thrust can be felt.

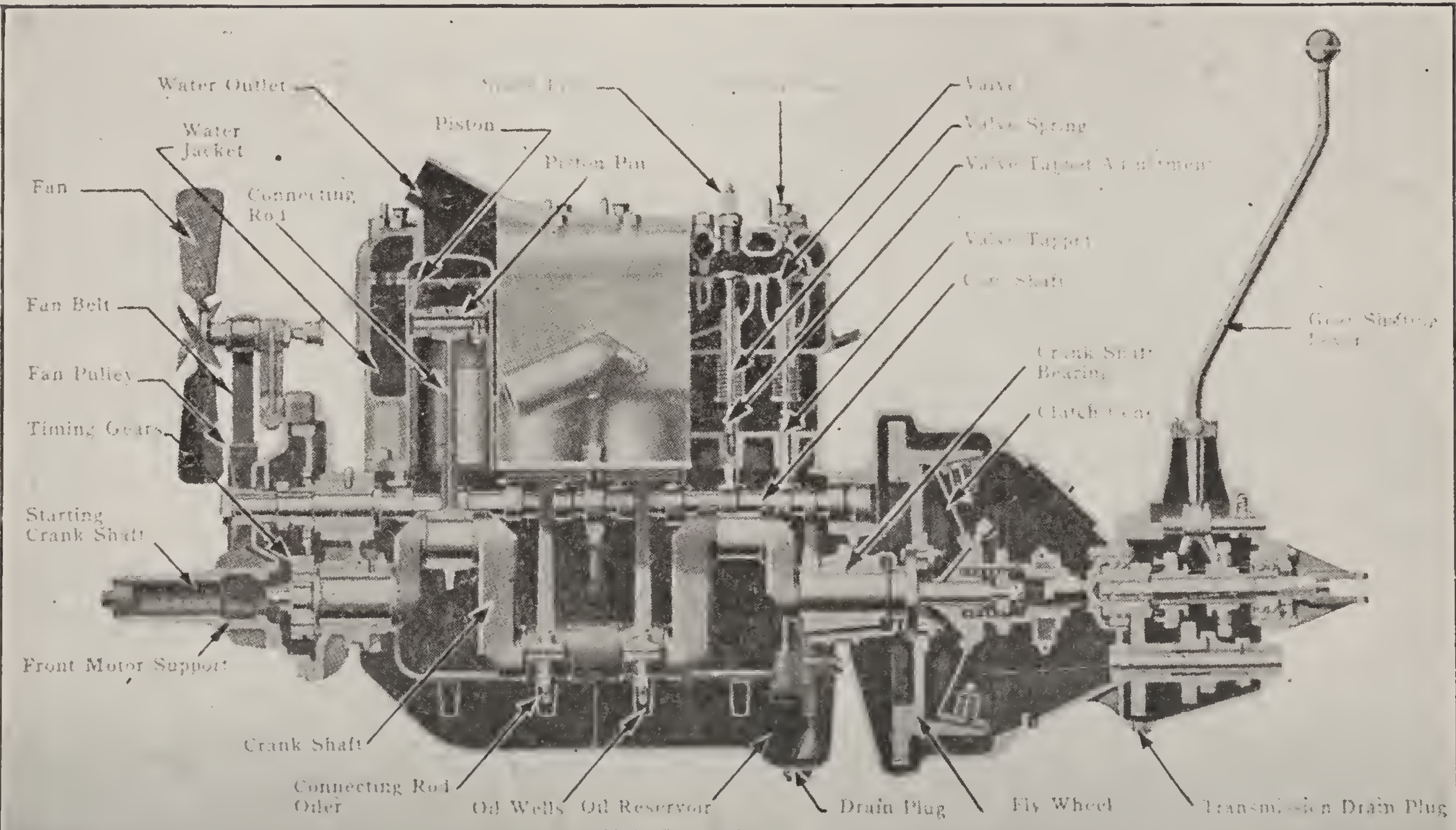
(Note—When steering knuckles are slightly worn, this play will sometimes be mistaken for play in the bearings of the front wheels.) Where the rear wheels run on bearings, the same method can be applied in adjusting, and where the wheel hub is tapered and keyed to the axle, the axle nut should be cinched to draw the hub tight on the taper.

Operation No. 43

To inspect the steering gear both front wheels should be jacked up. Be sure the steering bracket is tight to the frame of the car, and that the housing is full of grease. See that the steering arm is tight at its joint, and that there is no end play in the ball socket joints.

Operation No. 44

There has been quite a difference of opinion between automobile men in regard to proper mileage intervals to grind the valves. When the face of the valve becomes pitted, due to the chemical action of the heat and carbon on the face and seat of the valve, the valve should be ground, but many times they are ground, when they should only be cleaned and touched up. Every two thousand miles the valves should be removed, and the carbon scraped from them. The exhaust valves will require more attention than the intake valves, because they are in an open position when the burnt gasses are exhausted from the combustion chamber. The result is, carbon will form on the stem of the valve when in this open position, and when enough of it accumulates, it will act as a wedge to the proper closing



Unit Power Plant Side View

of the valves. After the valve and valve seats have been cleaned of carbon, and the valve faces or seats are not pitted, they should be touched up with a little fine valve grinding compound. After wiping the compound from the valve and seat, they should be polished with oil, using the same movement as in grinding the valves.

OPERATION No. 45

The carbon should either be scraped by hand or burnt out with oxygen by a competent repair man.

OPERATION No. 46

After cleaning or grinding the valves, the valve tapets should be inspected and adjusted if necessary, and the compression of the motor tested by using the hand crank. Open all the petcocks but one. In this way the compression of each cylinder can be tested separately.

OPERATION No. 47

The speedometer shaft should be inspected, and to properly lubricate, it should be removed from the cable, and smeared with a graphite paste made from Dixon's motor graphite and vaseline.

SERIES E—EVERY 5000 MILES

OPERATION No. 48

A thorough inspection of every part of the car should be made at this mileage interval, which includes Series A, B, C and E. While executing the various operations, every bolt and nut on the car should be inspected, and tightened if loose.

OPERATION No. 49

See that the fenders are tight on their brackets, and that the brackets are securely fastened.

OPERATION No. 50

See that the radiator base and stay rod are tight.

OPERATION No. 51

See that the windshield nuts are tight, and use a few drops of 3-in-1 oil on the hinges. Use a few drops of 3-in-1 oil on the top bow joints. See that the top saddles are tight. Use a few drops of 3-in-1 oil on their hinges.

OPERATION No. 52

A drop or two of 3-in-1 oil should be used on the friction surfaces of the different units that are on the instrument board, on the spark and gas hand levers, and on the foot accelerator joints.

OPERATION No. 53

Be sure the door hinges are tight. Use a few drops of 3-in-1 oil on the hinges and locks.

OPERATION No. 54

Be sure the license brackets are tight.

OPERATION No. 55

Inspect head, side, dash, and tail lights, and make sure they are tight and in proper working order.

OPERATION No. 56

Inspect wiring. Be sure all connections are tight. Be sure fuses fit tight in their sockets.

OPERATION No. 57

Be sure the dust pan is tight and doesn't rattle.

OPERATION No. 58

Be sure the engine support bolts are tight, and that motor is not loose on the frame.

OPERATION No. 59

Be sure the hood clamp springs are not broken and if lacing is used, little thin strips of felt, cut from an old felt hat, can be inserted under the lacing and will prevent the hood from rattling.

OPERATION No. 60

If an oil pump is used, be sure the oil is circulating, and if a strainer is used, it should be removed and washed in gasoline.

OPERATION No. 61

It is a simple job to remove the muffler, and clean the soot, and is as essential as cleaning a stove pipe. See that the body bolts are tight, while you are under the car.

OPERATION No. 62

Rust, scale and lime form in the tiny cells of your radiator and your water jackets, and act as an insulation against proper heat radiation. This scale can be removed with sal soda. A heaping teacup of sal soda should be used to every two gallons of water that your radiator holds. For example: If your radiator capacity is four gallons, two heaping teacups of sal soda should be dissolved in four gallons of hot water. The radiator should be drained and this solution poured in. Extreme care must be taken not to spill any of this solution on the painted surface of your car as it will ruin it. After the solution is added, the motor should be run for about a half-hour with the spark retarded, so the water will heat up. The car can be used on a short run while doing this. The solution should then be drained out and the radiator flushed with the garden hose several times before refilling with clean water.

Operation No. 63

The transmission and differential should be drained and flushed with coal oil and the lubricant replaced. The gears in these units are made from highly tempered steel, and when this steel wears, thin chips or slivers of steel scale from the gears. If these units are not thoroughly cleaned out, these tiny bits of steel work into the bearing surfaces, causing excessive wear.

SERIES F—10,000 MILES. COMPLETE INSPECTION

Operation No. 64

If you have properly cared for your car when this mileage interval is reached, and Series A, B, C, D and E have been done and checked, it should be running perfectly, but to keep it running that way the internal parts of your car should be dissembled and inspected by a competent repair man and your electrical instruments and carburetor thoroughly inspected and cleaned.

Operation No. 65

When the weather eats through the first coat of varnish and the lustre is gone, another coat of varnish will preserve the beauty and paint of your car.

HISTORY OF YOUR CAR

....
Name

....
Model

....
Serial No. of your Car

....
Motor No. of your Car

....
Date of Purchase

RECORD OF ACCIDENTS

SERIES

MILES	A	B	C	D	E	F
100		▨	▨	▨	▨	▨
200		▨	▨	▨	▨	▨
300		▨	▨	▨	▨	▨
400		▨	▨	▨	▨	▨
500			▨	▨	▨	▨
600		▨	▨	▨	▨	▨
700		▨	▨	▨	▨	▨
800		▨	▨	▨	▨	▨
900		▨	▨	▨	▨	▨
1000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
1100		▨	▨	▨	▨	▨
1200		▨	▨	▨	▨	▨
1300		▨	▨	▨	▨	▨
1400		▨	▨	▨	▨	▨
1500			▨	▨	▨	▨
1600		▨	▨	▨	▨	▨
1700		▨	▨	▨	▨	▨
1800		▨	▨	▨	▨	▨
1900		▨	▨	▨	▨	▨
2000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
2100		▨	▨	▨	▨	▨
2200		▨	▨	▨	▨	▨
2300		▨	▨	▨	▨	▨
2400		▨	▨	▨	▨	▨
2500			▨	▨	▨	▨
2600		▨	▨	▨	▨	▨
2700		▨	▨	▨	▨	▨
2800		▨	▨	▨	▨	▨
2900		▨	▨	▨	▨	▨
3000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
3100		▨	▨	▨	▨	▨
3200		▨	▨	▨	▨	▨
3300		▨	▨	▨	▨	▨
3400		▨	▨	▨	▨	▨
3500			▨	▨	▨	▨
3600		▨	▨	▨	▨	▨
3700		▨	▨	▨	▨	▨
3800		▨	▨	▨	▨	▨
3900		▨	▨	▨	▨	▨
4000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
4100		▨	▨	▨	▨	▨
4200		▨	▨	▨	▨	▨
4300		▨	▨	▨	▨	▨
4400		▨	▨	▨	▨	▨
4500			▨	▨	▨	▨
4600		▨	▨	▨	▨	▨
4700		▨	▨	▨	▨	▨
4800		▨	▨	▨	▨	▨
4900		▨	▨	▨	▨	▨
5000				▨		▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
5100		▨	▨	▨	▨	▨
5200		▨	▨	▨	▨	▨
5300		▨	▨	▨	▨	▨
5400		▨	▨	▨	▨	▨
5500			▨	▨	▨	▨
5600		▨	▨	▨	▨	▨
5700		▨	▨	▨	▨	▨
5800		▨	▨	▨	▨	▨
5900		▨	▨	▨	▨	▨
6000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
6100		▨	▨	▨	▨	▨
6200		▨	▨	▨	▨	▨
6300		▨	▨	▨	▨	▨
6400		▨	▨	▨	▨	▨
6500			▨	▨	▨	▨
6600		▨	▨	▨	▨	▨
6700		▨	▨	▨	▨	▨
6800		▨	▨	▨	▨	▨
6900		▨	▨	▨	▨	▨
7000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $..........

SERIES

MILES	A	B	C	D	E	F
7100		▨	▨	▨	▨	▨
7200		▨	▨	▨	▨	▨
7300		▨	▨	▨	▨	▨
7400		▨	▨	▨	▨	▨
7500			▨	▨	▨	▨
7600		▨	▨	▨	▨	▨
7700		▨	▨	▨	▨	▨
7800		▨	▨	▨	▨	▨
7900		▨	▨	▨	▨	▨
8000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $..........

SERIES

MILES	A	B	C	D	E	F
8100		▨	▨	▨	▨	▨
8200		▨	▨	▨	▨	▨
8300		▨	▨	▨	▨	▨
8400		▨	▨	▨	▨	▨
8500			▨	▨	▨	▨
8600		▨	▨	▨	▨	▨
8700		▨	▨	▨	▨	▨
8800		▨	▨	▨	▨	▨
8900		▨	▨	▨	▨	▨
9000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $

SERIES

MILES	A	B	C	D	E	F
9100		▨	▨	▨	▨	▨
9200		▨	▨	▨	▨	▨
9300		▨	▨	▨	▨	▨
9400		▨	▨	▨	▨	▨
9500			▨	▨	▨	▨
9600		▨	▨	▨	▨	▨
9700		▨	▨	▨	▨	▨
9800		▨	▨	▨	▨	▨
9900		▨	▨	▨	▨	▨
10000						

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $

SERIES

MILES	A	B	C	D	E	F
10100		▨	▨	▨	▨	▨
10200		▨	▨	▨	▨	▨
10300		▨	▨	▨	▨	▨
104)		▨	▨	▨	▨	▨
10)			▨	▨	▨	▨
1)		▨	▨	▨	▨	▨
)		▨	▨	▨	▨	▨
)		▨	▨	▨	▨	▨
)		▨	▨	▨	▨	▨
0)				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $ ....

SERIES

MILES	A	B	C	D	E	F
11100		▨	▨	▨	▨	▨
11200		▨	▨	▨	▨	▨
11300		▨	▨	▨	▨	▨
11400		▨	▨	▨	▨	▨
11500			▨	▨	▨	▨
1160		▨	▨	▨	▨	▨
11700		▨	▨	▨	▨	▨
11800		▨	▨	▨	▨	▨
11900		▨	▨	▨	▨	▨
12000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $ ....

SERIES

MILES	A	B	C	D	E	F
12100		▨	▨	▨	▨	▨
12200		▨	▨	▨	▨	▨
12300		▨	▨	▨	▨	▨
12400		▨	▨	▨	▨	▨
12500			▨	▨	▨	▨
12600		▨	▨	▨	▨	▨
12700		▨	▨	▨	▨	▨
12800		▨	▨	▨	▨	▨
12900		▨	▨	▨	▨	▨
13000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $......................

SERIES

MILES	A	B	C	D	E	F
13100		▨	▨	▨	▨	▨
13200		▨	▨	▨	▨	▨
13300		▨	▨	▨	▨	▨
13400		▨	▨	▨	▨	▨
13500			▨	▨	▨	▨
13600		▨	▨	▨	▨	▨
13700		▨	▨	▨	▨	▨
13800		▨	▨	▨	▨	▨
13900		▨	▨	▨	▨	▨
14000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $......................

SERIES

MILES	A	B	C	D	E	F
14100		▨	▨	▨	▨	▨
14200		▨	▨	▨	▨	▨
14300		▨	▨	▨	▨	▨
14400		▨	▨	▨	▨	▨
14500			▨	▨	▨	▨
14600		▨	▨	▨	▨	▨
14700		▨	▨	▨	▨	▨
14800		▨	▨	▨	▨	▨
14900		▨	▨	▨	▨	▨
15000				▨		▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
15100		▨	▨	▨	▨	▨
15200		▨	▨	▨	▨	▨
15300		▨	▨	▨	▨	▨
15400		▨	▨	▨	▨	▨
15500			▨	▨	▨	▨
15600		▨	▨	▨	▨	▨
15700		▨	▨	▨	▨	▨
15800		▨	▨	▨	▨	▨
15900		▨	▨	▨	▨	▨
16000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
16100		▨	▨	▨	▨	▨
16200		▨	▨	▨	▨	▨
16300		▨	▨	▨	▨	▨
16400		▨	▨	▨	▨	▨
16500			▨	▨	▨	▨
16600		▨	▨	▨	▨	▨
16700		▨	▨	▨	▨	▨
16800		▨	▨	▨	▨	▨
16900		▨	▨	▨	▨	▨
17000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $......................

SERIES

MILES	A	B	C	D	E	F
17100		▨	▨	▨	▨	▨
17200		▨	▨	▨	▨	▨
17300		▨	▨	▨	▨	▨
17400		▨	▨	▨	▨	▨
17500			▨	▨	▨	▨
17600		▨	▨	▨	▨	▨
17700		▨	▨	▨	▨	▨
17800		▨	▨	▨	▨	▨
17900		▨	▨	▨	▨	▨
18000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $......................

SERIES

MILES	A	B	C	D	E	F
18100		▨	▨	▨	▨	▨
18200		▨	▨	▨	▨	▨
18300		▨	▨	▨	▨	▨
18400		▨	▨	▨	▨	▨
18500			▨	▨	▨	▨
18600		▨	▨	▨	▨	▨
18700		▨	▨	▨	▨	▨
18800		▨	▨	▨	▨	▨
18900		▨	▨	▨	▨	▨
19000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $______________________

SERIES

MILES	A	B	C	D	E	F
19100		▨	▨	▨	▨	▨
19200		▨	▨	▨	▨	▨
19300		▨	▨	▨	▨	▨
19400		▨	▨	▨	▨	▨
19500			▨	▨	▨	▨
19600		▨	▨	▨	▨	▨
19700		▨	▨	▨	▨	▨
19800		▨	▨	▨	▨	▨
19900		▨	▨	▨	▨	▨
20000						▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $______________________

SERIES

MILES	A	B	C	D	E	F
20100		▨	▨	▨	▨	▨
20200		▨	▨	▨	▨	▨
20300		▨	▨	▨	▨	▨
20400		▨	▨	▨	▨	▨
20500			▨	▨	▨	▨
20600		▨	▨	▨	▨	▨
20700		▨	▨	▨	▨	▨
20800		▨	▨	▨	▨	▨
20900		▨	▨	▨	▨	▨
21000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $ ....

SERIES

MILES	A	B	C	D	E	F
21100		▨	▨	▨	▨	▨
21200		▨	▨	▨	▨	▨
21300		▨	▨	▨	▨	▨
21400		▨	▨	▨	▨	▨
21500			▨	▨	▨	▨
21600		▨	▨	▨	▨	▨
21700		▨	▨	▨	▨	▨
21800		▨	▨	▨	▨	▨
21900		▨	▨	▨	▨	▨
22000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $ ....

SERIES

MILES	A	B	C	D	E	F		Dollars	Cents
22100		▨	▨	▨	▨	▨	Gasoline		
22200		▨	▨	▨	▨	▨	Oil		
22300		▨	▨	▨	▨	▨	Grease		
22400		▨	▨	▨	▨	▨	Tires		
22500			▨	▨	▨	▨	Tire Repairs		
22600		▨	▨	▨	▨	▨	Mechanical repairs		
22700		▨	▨	▨	▨	▨	Material		
22800		▨	▨	▨	▨	▨	Washing		
22900		▨	▨	▨	▨	▨	Miscellaneous		
23000				▨	▨	▨	Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F		Dollars	Cents
23100		▨	▨	▨	▨	▨	Gasoline		
23200		▨	▨	▨	▨	▨	Oil		
23300		▨	▨	▨	▨	▨	Grease		
23400		▨	▨	▨	▨	▨	Tires		
23500			▨	▨	▨	▨	Tire Repairs		
23600		▨	▨	▨	▨	▨	Mechanical repairs		
23700		▨	▨	▨	▨	▨	Material		
23800		▨	▨	▨	▨	▨	Washing		
23900		▨	▨	▨	▨	▨	Miscellaneous		
24000					▨	▨	Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
24100		▨	▨	▨	▨	▨
24200		▨	▨	▨	▨	▨
24300		▨	▨	▨	▨	▨
24400		▨	▨	▨	▨	▨
24500			▨	▨	▨	▨
24600		▨	▨	▨	▨	▨
24700		▨	▨	▨	▨	▨
24800		▨	▨	▨	▨	▨
24900		▨	▨	▨	▨	▨
25000				▨		▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $.........................

SERIES

MILES	A	B	C	D	E	F
25100		▨	▨	▨	▨	▨
25200		▨	▨	▨	▨	▨
25300		▨	▨	▨	▨	▨
25400		▨	▨	▨	▨	▨
25500			▨	▨	▨	▨
25600		▨	▨	▨	▨	▨
25700		▨	▨	▨	▨	▨
25800		▨	▨	▨	▨	▨
25900		▨	▨	▨	▨	▨
26000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $.........................

MILES	SERIES A	B	C	D	E	F
26100		▨	▨	▨	▨	▨
26200		▨	▨	▨	▨	▨
26300		▨	▨	▨	▨	▨
26400		▨	▨	▨	▨	▨
26500			▨	▨	▨	▨
26600		▨	▨	▨	▨	▨
26700		▨	▨	▨	▨	▨
26800		▨	▨	▨	▨	▨
26900		▨	▨	▨	▨	▨
27000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $------------------------

MILES	SERIES A	B	C	D	E	F
27100		▨	▨	▨	▨	▨
27200		▨	▨	▨	▨	▨
27300		▨	▨	▨	▨	▨
27400		▨	▨	▨	▨	▨
27500			▨	▨	▨	▨
27600		▨	▨	▨	▨	▨
27700		▨	▨	▨	▨	▨
27800		▨	▨	▨	▨	▨
27900		▨	▨	▨	▨	▨
28000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $------------------------

SERIES

MILES	A	B	C	D	E	F
28100		▨	▨	▨	▨	▨
28200		▨	▨	▨	▨	▨
28300		▨	▨	▨	▨	▨
28400		▨	▨	▨	▨	▨
28500			▨	▨	▨	▨
28600		▨	▨	▨	▨	▨
28700		▨	▨	▨	▨	▨
28800		▨	▨	▨	▨	▨
28900		▨	▨	▨	▨	▨
29000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $ ....

SERIES

MILES	A	B	C	D	E	F
29100		▨	▨	▨	▨	▨
29200		▨	▨	▨	▨	▨
29300		▨	▨	▨	▨	▨
29400		▨	▨	▨	▨	▨
29500			▨	▨	▨	▨
29600		▨	▨	▨	▨	▨
29700		▨	▨	▨	▨	▨
29800		▨	▨	▨	▨	▨
29900		▨	▨	▨	▨	▨
30000						

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $ ....

SERIES

MILES	A	B	C	D	E	F
30100		▨	▨	▨	▨	▨
30200		▨	▨	▨	▨	▨
30300		▨	▨	▨	▨	▨
30400		▨	▨	▨	▨	▨
30500			▨	▨	▨	▨
30600		▨	▨	▨	▨	▨
30700		▨	▨	▨	▨	▨
30800		▨	▨	▨	▨	▨
30900		▨	▨	▨	▨	▨
31000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $......................

SERIES

MILES	A	B	C	D	E	F
31100		▨	▨	▨	▨	▨
31200		▨	▨	▨	▨	▨
31300		▨	▨	▨	▨	▨
31400		▨	▨	▨	▨	▨
31500			▨	▨	▨	▨
31600		▨	▨	▨	▨	▨
31700		▨	▨	▨	▨	▨
31800		▨	▨	▨	▨	▨
31900		▨	▨	▨	▨	▨
32000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $......................

SERIES

MILES	A	B	C	D	E	F
32100		▨	▨	▨	▨	▨
32200		▨	▨	▨	▨	▨
32300		▨	▨	▨	▨	▨
32400		▨	▨	▨	▨	▨
32500			▨	▨	▨	▨
32600		▨	▨	▨	▨	▨
32700		▨	▨	▨	▨	▨
32800		▨	▨	▨	▨	▨
32900		▨	▨	▨	▨	▨
33000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
33100		▨	▨	▨	▨	▨
33200		▨	▨	▨	▨	▨
33300		▨	▨	▨	▨	▨
33400		▨	▨	▨	▨	▨
33500			▨	▨	▨	▨
33600		▨	▨	▨	▨	▨
33700		▨	▨	▨	▨	▨
33800		▨	▨	▨	▨	▨
33900		▨	▨	▨	▨	▨
34000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $........................

SERIES

MILES	A	B	C	D	E	F
34100		▨	▨	▨	▨	▨
34200		▨	▨	▨	▨	▨
34300		▨	▨	▨	▨	▨
34400		▨	▨	▨	▨	▨
34500			▨	▨	▨	▨
34600		▨	▨	▨	▨	▨
34700		▨	▨	▨	▨	▨
34800		▨	▨	▨	▨	▨
34900		▨	▨	▨	▨	▨
35000				▨		▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $

SERIES

MILES	A	B	C	D	E	F
35100		▨	▨	▨	▨	▨
35200		▨	▨	▨	▨	▨
35300		▨	▨	▨	▨	▨
35400		▨	▨	▨	▨	▨
35500			▨	▨	▨	▨
35600		▨	▨	▨	▨	▨
35700		▨	▨	▨	▨	▨
35800		▨	▨	▨	▨	▨
35900		▨	▨	▨	▨	▨
36000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $

SERIES

MILES	A	B	C	D	E	F
36100		▨	▨	▨	▨	▨
36200		▨	▨	▨	▨	▨
36300		▨	▨	▨	▨	▨
36400		▨	▨	▨	▨	▨
36500			▨	▨	▨	▨
36600		▨	▨	▨	▨	▨
36700		▨	▨	▨	▨	▨
36800		▨	▨	▨	▨	▨
36900		▨	▨	▨	▨	▨
37000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $

SERIES

MILES	A	B	C	D	E	F
37100		▨	▨	▨	▨	▨
37200		▨	▨	▨	▨	▨
37300		▨	▨	▨	▨	▨
37400		▨	▨	▨	▨	▨
37500			▨	▨	▨	▨
37600		▨	▨	▨	▨	▨
37700		▨	▨	▨	▨	▨
37800		▨	▨	▨	▨	▨
37900		▨	▨	▨	▨	▨
38000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $

	SERIES								
MILES	A	B	C	D	E	F		Dollars	Cents
38100		▨	▨	▨	▨	▨	Gasoline		
38200		▨	▨	▨	▨	▨	Oil		
38300		▨	▨	▨	▨	▨	Grease		
38400		▨	▨	▨	▨	▨	Tires		
38500			▨	▨	▨	▨	Tire Repairs		
38600		▨	▨	▨	▨	▨	Mechanical repairs		
33700		▨	▨	▨	▨	▨	Material		
38800		▨	▨	▨	▨	▨	Washing		
38900		▨	▨	▨	▨	▨	Miscellaneous		
39000				▨	▨	▨	Total		

Average cost per mile $......................

	SERIES								
MILES	A	B	C	D	E	F		Dollars	Cents
39100		▨	▨	▨	▨	▨	Gasoline		
39200		▨	▨	▨	▨	▨	Oil		
39300		▨	▨	▨	▨	▨	Grease		
39400		▨	▨	▨	▨	▨	Tires		
39500			▨	▨	▨	▨	Tire Repairs		
39600		▨	▨	▨	▨	▨	Mechanical repairs		
39700		▨	▨	▨	▨	▨	Material		
39800		▨	▨	▨	▨	▨	Washing		
39900		▨	▨	▨	▨	▨	Miscellaneous		
40000							Total		

Average cost per mile $......................

SERIES

MILES	A	B	C	D	E	F		Dollars	Cents
40100		▨	▨	▨	▨	▨	Gasoline		
40200		▨	▨	▨	▨	▨	Oil		
40300		▨	▨	▨	▨	▨	Grease		
40400		▨	▨	▨	▨	▨	Tires		
40500			▨	▨	▨	▨	Tire Repairs		
40600		▨	▨	▨	▨	▨	Mechanical repairs		
40700		▨	▨	▨	▨	▨	Material		
40800		▨	▨	▨	▨	▨	Washing		
40900		▨	▨	▨	▨	▨	Miscellaneous		
41000				▨	▨	▨	Total		

Average cost per mile $..........................

SERIES

MILES	A	B	C	D	E	F		Dollars	Cents
41100		▨	▨	▨	▨	▨	Gasoline		
41200		▨	▨	▨	▨	▨	Oil		
41300		▨	▨	▨	▨	▨	Grease		
41400		▨	▨	▨	▨	▨	Tires		
41500			▨	▨	▨	▨	Tire Repairs		
41600		▨	▨	▨	▨	▨	Mechanical repairs		
41700		▨	▨	▨	▨	▨	Material		
41800		▨	▨	▨	▨	▨	Washing		
41900		▨	▨	▨	▨	▨	Miscellaneous		
42000					▨	▨	Total		

Average cost per mile $..........................

	SERIES					
MILES	A	B	C	D	E	F
42100		▨	▨	▨	▨	▨
42200		▨	▨	▨	▨	▨
42300		▨	▨	▨	▨	▨
42400		▨	▨	▨	▨	▨
42500			▨	▨	▨	▨
42600		▨	▨	▨	▨	▨
42700		▨	▨	▨	▨	▨
42800		▨	▨	▨	▨	▨
42900		▨	▨	▨	▨	▨
43000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $..............................

	SERIES					
MILES	A	B	C	D	E	F
43100		▨	▨	▨	▨	▨
43200		▨	▨	▨	▨	▨
43300		▨	▨	▨	▨	▨
43400		▨	▨	▨	▨	▨
43500			▨	▨	▨	▨
43600		▨	▨	▨	▨	▨
43700		▨	▨	▨	▨	▨
43800		▨	▨	▨	▨	▨
43900		▨	▨	▨	▨	▨
44000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $..............................

SERIES

MILES	A	B	C	D	E	F
44100		▨	▨	▨	▨	▨
44200		▨	▨	▨	▨	▨
44300		▨	▨	▨	▨	▨
44400		▨	▨	▨	▨	▨
44500			▨	▨	▨	▨
44600		▨	▨	▨	▨	▨
44700		▨	▨	▨	▨	▨
44800		▨	▨	▨	▨	▨
44900		▨	▨	▨	▨	▨
45000				▨		▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $

SERIES

MILES	A	B	C	D	E	F
45100		▨	▨	▨	▨	▨
45200		▨	▨	▨	▨	▨
45300		▨	▨	▨	▨	▨
45400		▨	▨	▨	▨	▨
45500			▨	▨	▨	▨
45600		▨	▨	▨	▨	▨
45700		▨	▨	▨	▨	▨
45800		▨	▨	▨	▨	▨
45900		▨	▨	▨	▨	▨
46000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $

	SERIES					
MILES	A	B	C	D	E	F
46100		▨	▨	▨	▨	▨
46200		▨	▨	▨	▨	▨
46300		▨	▨	▨	▨	▨
46400		▨	▨	▨	▨	▨
46500			▨	▨	▨	▨
46600		▨	▨	▨	▨	▨
46700		▨	▨	▨	▨	▨
46800		▨	▨	▨	▨	▨
46900		▨	▨	▨	▨	▨
47000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $..........................

	SERIES					
MILES	A	B	C	D	E	F
47100		▨	▨	▨	▨	▨
47200		▨	▨	▨	▨	▨
47300		▨	▨	▨	▨	▨
47400		▨	▨	▨	▨	▨
47500			▨	▨	▨	▨
47600		▨	▨	▨	▨	▨
47700		▨	▨	▨	▨	▨
47800		▨	▨	▨	▨	▨
47900		▨	▨	▨	▨	▨
48000					▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $..........................

SERIES

MILES	A	B	C	D	E	F
48100		▨	▨	▨	▨	▨
48200		▨	▨	▨	▨	▨
48300		▨	▨	▨	▨	▨
48400		▨	▨	▨	▨	▨
48500			▨	▨	▨	▨
48600		▨	▨	▨	▨	▨
48700		▨	▨	▨	▨	▨
48800		▨	▨	▨	▨	▨
48900		▨	▨	▨	▨	▨
49000				▨	▨	▨

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $

SERIES

MILES	A	B	C	D	E	F
49100		▨	▨	▨	▨	▨
49200		▨	▨	▨	▨	▨
49300		▨	▨	▨	▨	▨
49400		▨	▨	▨	▨	▨
49500			▨	▨	▨	▨
49600		▨	▨	▨	▨	▨
49700		▨	▨	▨	▨	▨
49800		▨	▨	▨	▨	▨
49900		▨	▨	▨	▨	▨
50000						

	Dollars	Cents
Gasoline		
Oil		
Grease		
Tires		
Tire Repairs		
Mechanical repairs		
Material		
Washing		
Miscellaneous		
Total		

Average cost per mile $

THE FORD CAR

Due to the simplicity in design of construction of the Ford Car, there are some operations under each series that should be canceled.

Series A should consist of Operations 1, 2, 3, 4, 5, 6, 7 and 8.

Series B should consist of Operations 11, 12, 13, 14, 17, 19, 20, 21, 22, 23, 26 and 27.

Series C should consist of Operations 31, 32, 33, 36, 38, 40.

Series D should consist of Operations 42, 43, 44, 45, 46 and 47.

Series E should consist of Operations 48, 49, 50, 51, 53, 54, 55, 56, 57, 58, 59, 61, 62 and 63.

Series F should consist of Operations 64 and 65. Under Series A, Operation No. 8 is left blank, and the outside rear axle roller bearing grease cups should have two complete turns at this mileage interval.

Under Series B, Operation No. 12, the steering connecting rod ball joints have no grease cups or are not packed with grease, but a few drops of oil should be squirted with an oil can in each joint.

Operation No. 14 calls for lubricating of the ignition unit. The Ford Car uses vibrating oils on the dash that require no lubricant, but the timer shell should be cleaned out with gasoline and at least a tablespoonfull of light machine oil added at this mileage interval. The timer roller revolves at a high rate of speed and is held in contact against the shell by a light spring. The use of heavy oil, especially in cold weather, will prevent proper spring action of the roller against the shell, causing missing and making the car hard to start. Either Three-in-One oil or a mixture of half kerosene and engine oil should be used.

Operations Nos. 15, 16 and 18 should be canceled unless your car is equipped with a starter, generator, and battery.

While executing Operation No. 20, when draining out the dirty kerosene, the front axle should be jacked up about one foot from the ground. This will spill most of the dirty kerosene out of the troughs under the connecting rods, and when the new oil is poured in it will force the remaining dirty kerosene out.

Operation No. 21 calls for lubricating and adjusting the clutch. The clutch and transmission run in a bath of oil and the only attention required is an adjustment.

Operations Nos. 34 and 35 should be canceled unless your car is equipped with electric starter or generator.

Under Operation No. 40, while adjusting the brakes with the rear wheels jacked up, the hand or emergency brake should not start to bind until the hand lever is two inches past the neutral point. The foot brake, low speed, and reverse pedals should be adjusted so that they start to bind half way down.

Under Operation No. 43, while inspecting the steering gear, the steering wheel should be removed and the housing that holds the post gears should be packed with a good medium cup grease.

LUBRICATION

Lubrication of metal is a simple process where there is not heat to contend with. For example: All grease caps, differential, transmission and bearings outside the motor, require only an application of oil or grease. The only element to destroy proper lubrication is foreign substances, such as dirt, sand, mud, and heat, due to slight friction, which proper lubricant will overcome. Proper lubrication of your motor has been a difficult and different problem, due to the duties the oil has to perform, and to the element that tends to destroy the quality of the oil.

When gasoline motors were first invented, the biggest problem was to keep the metal moving parts in the motor lubricated, and until a cooling system was discovered, the gasoline motor was a failure. The power developed by a gasoline motor is the pressure from "heat expansion," caused by the explosion of compressed gases in the combustion chamber. If a cooling system were not used, this terrific heat would cause the metal parts of the motor to become red hot, and burn or destroy the lubricating oil, which is a thin film of substance between the metal bearing surfaces, to prevent one part from touching the other. Nearly eighty per cent of this heat expansion, or power that your motor really develops, is sacrificed. About forty per cent of this heat is lost or absorbed in the cooling system, and thirty per cent escapes through the exhaust valve, when it opens to let out the burnt gases. The other ten per cent of power is lost in friction and air resistance. Summing up what we have just said, goes to show what an important factor proper cooling of the gasoline motor is, and its relation to proper lubrication of the motor. As long as the body and quality of the oil holds up, under the intense heat that the motor develops, it acts as a barrier against any friction of the moving parts of the motor. The oil has another important duty to perform, for it acts as a seal to close up what small space there is between the piston and cylinder walls. As long as the oil seals this space we get compression which is so essential to obtain power.

You will notice when you fill your empty crank case with new oil, that it has a clear color, but if you were to drain this oil in a day or so, you would find that it had turned black. This is natural, due to the chemical action in the oil and is caused by certain elements being changed to sediment from the heat of the motor. Carbon is the base of oils, and in time, intense heat will turn the oil to carbon and break down the body of the oil. As soon as the body of the oil breaks down, it does not act as a seal between the cylinder and piston walls. This will result in loss of compression and some of the gasoline vapor that should be compressed on the compression stroke of the piston will escape through this broken down seal of space into the crank case where it is condensed into gasoline and thins the oil.

The longer you run, the thinner the oil will get. When you add a quart or so of new oil, the thin oil will find its way up through the space that should be sealed with good oil, into the combustion chambers where it is burnt and forms carbon. If the main body of oil in the crank case is of the proper quality, the fresh oil that is added daily will not be wasted because the main body of oil has kept the compression space sealed.

The first step toward proper lubrication is to use the best oil. The next step is to change it when it loses its body or quality, and the last step is to guard against the over-heating of the motor that destroys the lubricating qualities of the oil.

We have done considerable experimenting, and a record of our tests shows that it is advisable to change the oil every 500 miles. If you will use our system of upkeep, your motor will not heat up from the following causes, and if you will install one of Boyce's motor meters on your radiator, you can tell the temperature of your motor at a glance.

REASONS FOR OVERHEATING THE MOTOR

1. Not enough water in the radiator. (See Operation No. 3.)
2. Rust, scale and lime in the water jackets, and in the tiny cells of your radiator, forming an insulation against proper heat radiation. (See Operation No. 62.)
3. If the fan blades are not bent at the proper angle, and the fan is not driven at the proper speed, water in your radiator will not be properly cooled. (See Operation No. 13.)

4. If soot is allowed to collect on the muffler walls it will clog them up and cause a back pressure of the exhaust gases, not only heating the motor, but with a loss of power, due to the burnt gases not being able to escape. (See Operation No. 61)

5. If you drive your car with a retarded spark, the area of combustion chambers is enlarged, or the space, in which the explosion takes place, is enlarged because the piston is traveling on its downward stroke, instead of being at exact top center, where it should be when the explosion has reached its greatest pressure, resulting in a loss of power and excessive heat. By advancing the spark, it ignites the gas before the piston comes to the top, with the result that the gasoline has had time to ignite properly and has reached its greatest pressure with the piston at the top center.

6. Your carburetor mixes the proper proportions of air with gasoline (about twenty parts of air to one part of gasoline. Oxygen is required to burn anything. For example: A stove will not burn unless air is sucked in through a draught. It is the oxygen in the air that is used, and the carburetor should admit enough oxygen or air to properly burn the gasoline. A lean mixture means just enough air to make the gasoline combustible, and a rich mixture leaves a deposit of soot in the combustion chambers, causing the motor to overheat, and giving a sluggish explosion.

7. If the carbon is not removed from the combustion chambers, it will turn red hot, and not only heat up the motor, but cause pre-ignition, or explode the gasoline mixture before the electricity gets a chance to. (See Operation No. 19.)

8. Not enough or a poor quality of oil in the crank case caused by being thinned with gasoline and being turned to carbon and sediment by heat of the motor, will cause friction, and heat the motor. (See Operation No. 20.)

9. Overtaxing the motor by overloading the car, or by letting the brakes drag will heat the motor quickly.

10. Mud between the tubes or cells of your radiator will prevent proper air circulation and should be washed with a hose. Direct the stream from the inside to outside of the radiator.

11. Excessive priming of your motor, allowing raw gas being sucked into the combustion chambers of your motor, will wash the thin film of oil from the cylinder walls and before the lubricating system gets a chance to splash new oil on the cylinder walls, sealing the compression space, the raw gas and gasoline vapor escapes into the crank case and thins the oil.

ELECTRICITY

In order to become familiar with the electrical equipment of your car, it is necessary first to learn some of the fundamental principles of electricity.

Just what electricity, magnetism or gravity really is, has never been discovered, but we know certain rules that govern them.

We don't know why, when we throw a stone in the air it will come down; why electricity makes magnetism, why magnetism makes electricity, or why the action of certain chemicals on certain metals makes electricity, but we know certain rules that govern all these elements.

Magnetism and electricity are closely related, as one will produce the other, and the principle of electric motors and generators is based on these facts.

In order to get a clear understanding of what we mean when we say magnetism and electricity will make one the other, try the following experiment:

Take four dry-cell batteries and connect them in series. Take a bundle of wires about seven inches long and make the bundle one inch in diameter (hair pins will do). Around the bundle wrap one thickness of paper and tie the ends with string. Now take a piece of lamp cord or magnet wire about six feet long. Leave an end two feet long and wrap the wire closely together in a coil around the bundle of wires, leaving about two feet free at the other end. If you attach one end of the wire to the positive pole of the battery and the other end to the negative pole of the battery, the current flowing through the wire will make a magnet of the bundle of wires.

This will prove to you that electricity will make magnetism. Magnetism will penetrate anything. To prove this, take a handfull of iron shavings and sprinkle them on a sheet of paper. Now, hold the magnet under the paper and move, noting the peculiar arrangement of the iron shavings.

Now, to prove that magnetism will make electricity, take about six feet more of insulated wire—the same as you used on the first coil, or finer wire is better, and wrap closely over the other coil of wire that you wrapped on the bundle, leaving about a foot on each end. Now, if you will have someone scrape the ends of this second winding together while you connect and disconnect quickly, one end of the wire of the first coil that is attached to the batteries, a spark will occur at the points of the second coil of wire, although it is insulated from the first coil of wire.

This current of electricity produced in the second coil is done by what we call magnetic induction, and is the same principle that is used to produce a high tension or a high voltage of current at your spark plug.

Breaker points in your ignition unit when they open and close, cause a current to flow in the secondary windings and to the spark plugs using the same principle as you used in your experiment by connecting and disconnecting one end of the first coil of wire to the batteries.

Instead of one coil of wire for the second winding as you used, the coil in your car is composed of hundreds of feet of tiny wire about the thickness of a hair that is insulated, and when the current is interrupted in your ignition unit, this causes by a magnetic induction, a high pressure of current to be built up in the secondary windings. While the voltage at your battery is usually six or twelve volts by magnetic induction caused from interrupting the current and inducing an electric current in the secondary windings of your coil, you obtain approximately 10,000 volts at the spark plug. To make this plainer, compare it with the garden hose. If you take the nozzle from the hose and allow the water to flow, there is not much force, but if you hold your thumb over the end of the hose a great pressure is built up in the hose, and by moving your thumb a little tiny stream will be forced a great distance, just as the voltage built up in the secondary windings in the coil of your car has force enough to cause the electricity to jump the air gap in your spark plug.

To cause any current of electricity to flow, you must first make a path for it to flow in, then a circuit must be made, that is, the current will flow through the path you have made only if the circuit is complete, or if the path leads from the source of the current back again to where it was produced. To prove that, lay your coil that you have just made on a piece of metal on a table—a sheet of copper, or brass is better. Now, hold one end of your secondary winding firmly on the metal and while someone interrupts the primary winding you scratch the metal with the other end of the secondary winding. You will find that the current has passed through the metal back again to the other end of the coil wire. When you ground one end of the current source (of which there are always two) to any metal, such as the frame of a car, or in case of a telephone to the ground, the current will pass through that ground back to its source after it has done its work, such as light a light, or ring a bell. That system of completing a circuit is called a one-wire system, while a two-wire system means that the current is taken from the source back to the source, through insulated wires.

The source of a current or where it flows out of a generator, coil, or a battery is usually called the positive terminal, and where it comes back or returns to its source, it is usually called the negative terminal. If you wanted to determine the terminals and they were not marked, take a glass of water and dissolve four tablespoonfulls of salt in it. Now take the two ends of your wires leading from the source of the current and hold them one-quarter of an inch apart. The current will pass through the water if you dip the ends of the wire into the glass, completing the circuit, but bubbles will form on the bare end of the negative wire and, of course, the other wire is the positive wire. Terminals are marked pos or + for positive and the other neg or — for negative.

It should be clear to you now that current will flow if there is a path for it to flow in, whether it is an insulated wire to ground, and through ground to another insulated wire and back to source, or just through two insulated wires back to source. Anything that will conduct electricity, such as copper, brass, iron, water, or ground, is called a conductor and is used to make a path for the current to flow, while anything that will obstruct the flow of the current, such as glass, fibre, rubber, paper, cloth, or air, is called a non-conductor or insulator of current.

If you build a tank for water upon a building and fill it with water for fire protection, you measure the amount of water by gallons, the amount that flows by pounds, and the conductor or pipes that form walls or resistance against it all flowing at once, you would measure in inches.

If you build a big or little generator or battery to produce a current of electricity, you would call the amount that it produced or the pressure, so many volts, and the amount that really flowed from the source you would call amperes, and the conductor or wires with their insulation, you would call resistance or ohms. So while you call water by pounds, gallons, and pipes, you call electricity by volts, amperes and ohms. One gallon of water in a tank, flowing through an inch pipe, at the rate of one pound a minute, would have a certain force, and we call it force, while one volt of electricity, flowing at the rate of one ampere, with a resistance of one ohm, we call a watt, and it takes 746 watts to make one horse power. One horse power is equal to 33,000 pounds lifted one foot in one minute.

The difference between water and electricity as I have compared them, is that the water does not have to go back to its source, while the electricity does, and the water will get there if you open a valve as soon as gravity will let it, while the instant you close a switch and form a circuit for electric current, it has flowed and will continue to flow as long as the source is not exhausted.

To obtain a large amount of water from a tank in a hurry, you must use a large pipe, while to obtain a large amount of current from a source of current, you must use a large wire because it offers the least resistance, such as the wires that lead from the battery to the starting motor of an automobile, and deliver a large amount of current, although a small wire would get the current there instantly and have no advantage over the big wire relative to speed, the big wire would deliver the volume. After getting these rules clear in your mind, take up each electric instrument, one at a time, and study first their principle and then their different functions.

Your generator turns mechanical power into electrical energy. This electrical energy charges your battery. Your battery furnishes electric current for starting, lighting, horn, and where magneto is not used, for ignition.

Your battery does not contain electricity, but the chemical action of the chemical solution on the metal plates of your battery produce an electric current. When you charge your battery you get a reversal of this chemical action and the charging current passing through your battery changes crystals of chemicals back into liquid form.

"BE SURE AND DON'TS"

1. Don't start on a trip unless the work outlined in your system has been done.
2. Be sure it is checked, if you are sure it has been done.
3. Be sure you have an extra pair of headlight globes in your car, also extra fuses.
4. Don't let the water in your radiator boil, or reach a temperature of over a hundred and seventy degrees.
5. Be sure your shifting lever is in neutral position, before starting the car.

6. Don't use your electric starting motor to move the car under any consideration.

7. Be sure to disengage the clutch before you use the starter, especially in cold weather, when the grease in the transmission is hard, as this only adds to the load your motor has to carry.

8. Don't use your starting motor excessively, as it takes about thirty minutes to replenish the battery with the energy used by the starter in thirty seconds.

9. Be sure and burn the lights for several hours on a long trip if your battery was fully charged when you started, as excessive charging will overheat the battery. This can be determined by feeling the lead straps on the top of the battery to see if they are warm.

10. Don't use your foot brake continually when descending a long hill. By using the emergency brake and compression of the motor, you can give the foot brake a rest.

11. Be sure and retard the spark before starting the motor.

12. Don't run your car faster than twenty-five miles an hour, if the car is new, or has just been overhauled.

13. Don't use your brakes to stop the car unless your clutch is disengaged.

14. Don't prime your motor any more than is necessary. Raw gas in the combustion chambers thins the oil on the cylinder walls.

15. Don't race the motor without a load.

16. Don't attempt to change gears with the clutch engaged.

17. Don't fail to release the emergency brake before attempting to start the car.

18. Don't start the car with a jerk. If the clutch grabs, "tease" it until it can be remedied.

19. Don't change to reverse gear, unless you bring the car to a dead stop.

20. Don't jump at conclusions. "Safety First."

21. Don't apply the brakes when the car starts to skid.

22. Don't allow your car to stand any length of time with your ammeter showing a discharge, and your ignition and light switches off. Jar the dash board with your fist to be sure the needle isn't stuck. If this doesn't remedy it, disconnect one of the wires at the battery terminals and it will prevent the current from being drained from the battery until you can determine the cause.

23. Be sure the battery terminals are clean and tight. If the car is dead and lights won't light, nor motor start, this must be caused from corrosion at the battery terminals obstructing the flow of the current.

24. Don't allow the carburetor to leak. This may be caused from a tiny particle of dirt under the needle valve or the float may be stuck. Jar the manifold lightly with a hammer to release the float.

25. Don't try to adjust the carburetor unless you know how, and then be sure the motor is warm, that the ignition is perfect and that the compression of your motor is normal.

26. Don't be misled in testing a spark plug. Widen the gap when testing, as the conditions under which the current must jump the gap, under compression of the motor, are different than a test in the open air.

27. Don't allow water or moisture to collect around your ignition unit, high tension wires or plugs, as water is a good conductor of electricity and will lead the current to ground before it has a chance to jump the gap in the spark plug.

28. Don't test your battery with a hydrometer after you have added distilled water and thinned the solution. Test it first.

29. Be sure and close your throttle before releasing the clutch to shift gears.

30. Be sure and release the clutch before shifting gears.

31. Don't run on a flat tire. If you have to come, remove the tire and wrap a rope around the rim.

32. Be sure and prime your motor in cold weather. If a drain cock isn't handy tie a piece of string around the neck of a valve dust cover and bail gas from your tank.

Knowledge is not knowing about a thing,
but knowing the thing.

An adjustment made at the proper time,
will save more work than the
stitch that saved nine.

THRIFT

Means Economical Management.

SYSTEM

Is the Axis on which this Commercial World revolves.

BOTH

Must be used in Properly Caring for Your Car.